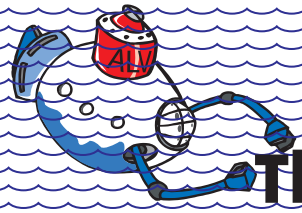

The Puzzle of the Ice Age Americans

Focus
Origin of the first humans in the Americas

Grade Level
9-12 (Biology/Anthropology)

Focus Question
When did the first humans arrive in North America, where did they come from, and how did they get here?

Learning Objectives
Students will be able to describe alternative theories for how the first humans came to the Americas, and explain the evidence that supports or contradicts these theories.

Students will be able to explain how exploration of a submerged portion of the North American west coast may provide additional insights about the origin of the first Americans.

Students will be able to describe the role of skepticism in scientific inquiry.

Materials
❒ Copies of "Key Questions for Exploring the History of Ice Age Americans," one copy for each student or student group

Audio/Visual Materials
None

Teaching Time
Two or three 45-minute class periods, depending upon the amount of class time spent on research and writing

Seating Arrangement
Classroom-style or groups of two to four students

Maximum Number of Students
30

Key Words
Monte Verde
Beringia
Daisy Cave
Ice-free corridor
Meadowcroft Rock Shelter
Kennewick Man
Clovis points

Background Information
The origin of the first people to inhabit North and South America has been a subject of controversy for more than 40 years. Examining the available evidence for various theories offers fascinating snapshots of life in the last Ice Age, as well as some important lessons about the way science works.

In 1927, archaeologists working near Folsom, New Mexico discovered a stone spearhead point embedded in the rib cage of an extinct bison. This discovery provided direct proof that humans and large extinct mammals co-existed for a time, and that humans had arrived in North America by the end of the Pleistocene epoch (about 11,000 years ago). Several years later, distinctive long spear points were discovered at an archeological site near Clovis, New Mexico, along with bones of prey dated to as much as 11,200 years ago.

During the years following discovery of sites at Folsom and Clovis, a theory developed that became widely accepted as fact, even though there was very little supporting evidence. This theory proposed that the first humans to enter North America were a small group of hunters that migrated from Asia by walking across a land bridge between Asia and North America about 15,000 years ago. These pioneers, called "Clovis people," carried thrusting spears tipped with specialized stone points that made them very successful hunters of the large mammals that inhabited North America. Their success allowed the first group to rapidly expand throughout North and South America, and after approximately 1,000 years, the Clovis people are supposed to have exterminated 33 genera in North America and more than 50 genera in South America. The key element of this theory is that the "Clovis people" were the first human inhabitants of North and South America; hence this theory has come to be known as the Clovis-First model.

The Clovis-First model was repeatedly challenged on several grounds. One problem is that the distinctive stone spear points that are a key part of the model have not been found in Siberia, which is supposed to have been the point of departure for the pioneers. A related problem is that the stone points found in the United States appear to be older than points found in the far north. In addition, other stone projectile points, shaped differently than the Clovis points, have been found from sites in the United States that are just as old as the Clovis specimens. Most problematic for fans of the Clovis-First model was the discovery of sites in North and South America that are much older than the Clovis sites. The response of Clovis-First proponents provides an important lesson to students of science.

Bonnichsen and Turnmire (1999) comment: "In scientific research, debate should be regarded as a normal part of the process of advancing knowledge. Unfortunately, the debate over the peopling of the Americas has not operated in this manner. Rather than using the debate as a positive forum for testing competing hypotheses about the initial peopling of the Americas… a very conservative group of Late-Entry advocates has systematically attacked all claims for pre-12,000-year-old-occupation in the Americas…Perhaps the worst consequence of the debate is that it has become next to impossible to raise research funds through competitive grantsmanship to conduct research at archaeological localities that may be greater than 11,500 years old."

Despite this opposition, the Clovis-First model has been almost completely discredited during the past five years. Perhaps the most important single event that has brought about this change is the discovery and 20-year study of Monte Verde, an unusually well-preserved site in southern Chile that has been dated to between 12,500 and 13,000 years before present. In 1997, a group of specialists performed a detailed review of data collected from Monte Verde, and concluded that the age determinations were correct, effectively putting an end to the Clovis-First theory.

But many questions still remain about the first humans to arrive in the Americas. While there is general agreement that they probably came

from Asia, when did they come? How did they come? Did they arrive as a single group, or as multiple groups, possibly from different races?

Investigations of the coastal migration hypothesis are complicated by the fact that sealevel has varies by more than 100 meters during the last 15,000 years. During the last Ice Age, when some of the most critical coastal migrations may have occurred, significant amounts of ocean water were retained in glaciers, causing the shorelines to be much farther seaward than they are today. As the glaciers melting, these ancient shorelines were drowned in deep waters, making explorations for artifacts much more difficult than on land. Explorations are further hampered by the restless character of the western North American shore, where tectonic forces are responsible for frequent earthquakes (and the occasional volcano) which can totally transform a shoreline in a matter of a matter of minutes. Still, some tantalizing artifacts have been found, and most of the ancient shoreline is still unexplored (see http://oceanexplorer.noaa.gov/explorations/02quest/background/paleo/paleo.html for more discussion and maps that compare ancient shorelines with our present coast).

In this exercise, students will research the answers to key questions about the history of the Ice Age Americans. Some of these questions are the focus of investigations being conducted as part of the Ocean Exploration 2002 Expedition, "Continuing the Legacy of Lewis and Clark: Unveiling A Submerged Portion of the Ancient West Coast of North America and the Passage of the First New World Explorers."

Learning Procedure

1. Explain the background to the Clovis-First theory and the theory's major features. List some of the problems with the theory, and describe the behavior of the theory's proponents. Lead a discussion of how scientific theories evolve and change. In general, skepticism of change is an important part of science, and new theories have to be supported by substantial evidence. On the other hand, it is also important for new evidence to receive a fair hearing. The history of science contains many examples of visionaries whose ideas were considered ridiculous for many years before they were finally accepted as correct.

2. Distribute "Key Questions for Exploring the History of Ice Age Americans." Divide the questions evenly among students or student groups. Draw the students' attention to the four reference articles on the Internet. If you choose to download and copy these, be aware that some of these articles are copyrighted, and that "text and photographic images are intended solely for on-screen viewing by the individual user." Have students prepare oral or written reports on the questions they are assigned to research. Emphasize that there may be more than one answer for some questions.

3. Have students present results of their research in a seminar format. Encourage discussion of various pieces of evidence, as well as speculation on possible explanations that have not been investigated.

When all results have been presented, have each student write a brief summary describing what they believe to be the most probably explanations of when, how, and from where the first Americans arrived in North America.

The BRIDGE Connection

www.vims.edu/bridge/archeology.html

The "Me" Connection

Have students write an essay on why the question of the origin of the first Americans is or is not worthy of publicly supported research.

Connections to Other Subjects

English/Language Arts, Geography, Earth Science

Evaluation

Use oral presentations on research questions and individual written summaries as evaluation tools.

Extensions

Have students visit http://oceanexplorer.noaa.gov to keep up to date with results of the Ocean Exploration Ring of Fire 2002 Expedition.

Resources

http://oceanexplorer.noaa.gov/explorations/02quest/background/paleo/paleo.html – Introduction to the Ocean Exploration 2002 Expedition investigating the passage of the first New World explorers.

http://www.peak.org.csfa/index.html – Web site for the Center for the Study of the First Americans

http://www.calacademy.org/calwild/sum99/mariners.htm – Article on "The Riddle of the Ancient Mariners"

http://www.jqjacobs.net/anthro/paleoamericans.html – Online article on issues and evidence relating to peopling of the New World

http://osu.orst.edu/dept/press/iceageIntro.html – Bonnichsen, R., and K. Turnmire, 1999. Introduction to "Ice Age People of North America"

http://www.ipcb.org/archaeo/usnews.html – Articles on theories and evidence related to first Americans

National Science Education Standards

Content Standard A: Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Content Standard G: History and Nature of Science

- Science as human endeavor
- Nature of scientific knowledge
- Historical perspectives

Activity developed by Mel Goodwin, PhD, The Harmony Project, Charleston, SC

Key Questions for Exploring the History of Ice Age Americans
TEACHER'S VERSION

1. Why is Monte Verde unusual among archaeological sites in the Americas?
   (It is widely acknowledged to have been inhabited 12,800 years ago, and has a large number of artifacts that are exceptionally well-preserved.)

2. What is Beringia?
   (A land bridge that is believed to have connected Asia and North America during the last Ice Age)

3. What is the significance of Daisy Cave?
   (Evidence of ocean-going watercraft has been found at Daisy Cave which is on San Miguel Island in southern California. This was an island even during the Ice Ages (so it could only have been reached by boat), and there is evidence of human activity preceding 10,500 years ago. These observations support the idea that some of the first Americans may have traveled by sea.)

4. When did people use boats to travel from Indonesia to Australia?
   (At least 30,000 years ago)

5. What is the "ice-free corridor?" Did it ever exist?
   (A theoretical route by which the first Americans entered North America. The evidence for its existence in conflicting.)

6. Who is Carol Mandryk and what does her research show?
   (A paleoecologist at Harvard University who has investigated prehistoric vegetation in Alberta which would have been at the southern end of the "ice-free corridor." She found that there was not enough biomass to support humans until after 13,000 years ago, and that the corridor was no open until 11,500 years ago.)

7. What is the significance of Meadowcroft Rock Shelter and Pedra Furada?
   (They are sites whose age appears to be much older than other site.)

8. What are some possible explanations for the absence of early American artifacts from the Pacific coast of North America?
   ((a) Early Americans weren't there; or (b) artifacts have been obscured by rising sea level, coastal erosion, or earthquake activity; or (c) artifacts may not have been preserved; or . . .)

9. What is the significance of Kennewick Man?
(These are the remains of a human who lived 9,300 years ago in what is now southeast Washington, but does not resemble any of the racial groups thought to have been in that area, suggesting that early Americans may have been more diverse than previously supposed.)

10. What do studies of mitochondrial DNA reveal about when early Americans may have left Asia?
(Data suggest departures of 15,000 to 30,000 years ago.)

11. What do linguistic studies suggest about when the first Americans arrived?
(The studies suggest that the first Americans arrived at least 35,000 years ago.)

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